

# Health

*Washington State Department of Health's summary of pesticide-related investigations during 2004.*

## Background

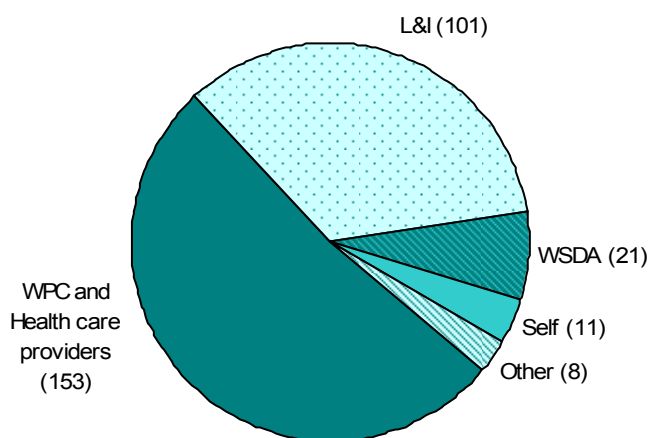
The Department of Health (DOH) Pesticide Program investigates reports of illness related to pesticide exposure. Data collected from the investigations are used to identify public health problems and develop strategies for prevention.

This DOH report on 2004 pesticide-related data describes sources of case reports, classification and severity of investigated cases, and the number and location of DOH investigations. Data on occupational cases, agricultural cases, and non-agricultural cases are presented. The section concludes with a description of DOH pesticide illness prevention activities.

## Sources of Case Reports

DOH receives reports of suspected pesticide illness from numerous sources, including WPC, L&I Claims Administration Program, WSDA, health care providers, and others (Figure 6). More than one agency may report the same illness event. See Combined Agency Data on page 8 for a description of reporting requirements and patterns of referral between agencies.

**Figure 6. Source of Case Reports, 2004**



DOH reviews reports of suspected pesticide illness incidents and conducts preliminary interviews to determine if the incidents should be investigated. An incident is investigated if all of the following conditions apply:

- a pesticide exposure is reported
- symptoms are reported
- the pesticide exposure occurred during the last 3 months
- the pesticide exposure occurred in Washington State
- the pesticide exposure was not an intentional suicide gesture

An incident may involve multiple cases (persons) who experience pesticide illness. The incidents investigated by DOH and found to be definitely, probably or possibly related to the pesticide exposure are briefly described by case number in Appendix C.

#### **Increased Investigation of WPC cases - December 2004 through February 2005**

Prior to the implementation of electronic reporting, WPC reporting criteria included symptomatic illness where the person had seen a health care provider or WPC had referred the person to a health care provider. DOH was interested in capturing and evaluating calls in which a health care provider was not initially involved, but the person later sought health care when the symptoms worsened. Electronic reporting provided an opportunity to expand reporting criteria to include these cases. From December 2004 through February 2005, DOH investigated symptomatic cases with no health care provider involvement. This contributed to increased numbers of cases opened for investigation during these months. Due to limited resources, DOH discontinued investigating cases in which health care providers were not involved beginning March 1, 2005. Details from these additional cases will be described in the 2006 PIRT report along with other analyses of 2005 data.

#### **Classification of Investigated Cases**

DOH Pesticide Program investigators interview individuals, obtain pesticide application records and medical records and, on occasion, conduct field visits. Data from investigations are used to classify how likely it is that the symptoms reported are related to a pesticide exposure. Case classification is determined through documentation of the exposure, documentation of the health effect, and evaluation of the causal relationship. DOH uses the NIOSH Case Classification System to distinguish between Definite, Probable, Possible, Suspicious, Insufficient Information, and Unlikely cases. Case classification criteria are listed in Appendix B. Minimal criteria for assignment to Definite, Probable, and Possible classifications are that reported symptoms are characteristic of known toxicological effects of the pesticide agent, and the temporal relationship between the exposure and symptoms is plausible. Further description of Definite, Probable, and Possible (DPP) cases is provided in Table 23.

**Table 23. Classification Criteria of Definite, Probable, and Possible Pesticide Illness Cases**

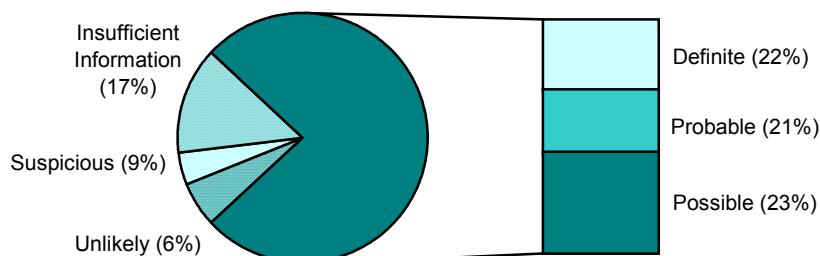
	Evidence of Exposure	Signs* and Symptoms**
<b>Definite</b>	Laboratory, clinical, or environmental evidence corroborates exposure, and →	Two or more post-exposure health effects (one a sign) or lab findings are reported by a licensed health care provider.
<b>Probable</b>	Laboratory clinical, or environmental evidence corroborates exposure, and →	Two or more post-exposure symptoms are reported.
<b>Probable</b>	Evidence of exposure is based on report from case, witness, application, observation of residue or contamination, and →	Two or more post-exposure health effects (one a sign) or lab findings are reported by a licensed health care provider.
<b>Possible</b>	Evidence of exposure is based on report from case, witness, application, observation of residue or contamination, and →	Two or more post-exposure symptoms are reported.

\* Signs are objective evidence of illness and are observable on examination (e.g. low heart rate, cough, rash).

\*\*Symptoms are subjective evidence of illness and are not observable on examination (e.g. headache, nausea, dizziness).

In 2004, 204 (76%) of the reported cases were determined to be definitely, probably, or possibly related to pesticide exposure. Figure 7 illustrates the classification of cases for 2004.

**Figure 7. Classification of Cases 2004**



The number of DPP cases for the years 2000 through 2004 is listed in Table 24.

**Table 24. Definite, Probable, and Possible Case (DPP) Classification, 2000 - 2004**

Classification	2000	2001	2002	2003	2004
Definite	32	21	50	69	63
Probable	85	51	60	53	55
Possible	86	48	64	62	86
<b>Total DPP</b>	<b>203</b>	<b>120</b>	<b>174</b>	<b>184</b>	<b>204</b>
Percent DPP	52%	48%	64%	67%	76%
<b>All Cases Reported</b>	<b>388</b>	<b>250</b>	<b>270</b>	<b>275</b>	<b>269</b>

Although the percentage of cases classified as DPP appears to have increased since year 2000, this is mostly an artifact of a change in how DOH tracks cases. Prior to 2002, cases that were investigated but found to be asymptomatic or unrelated were entered into the database and tracked. Beginning in 2002, these cases are no longer entered or tracked.

In 2004, 38 investigated cases were classified as insufficient information. These are cases in which only one symptom was reported, or DOH was unable to document the pesticide involved, or the patient couldn't be reached for an interview, or medical records were inconsistent with the patient's report of illness. The percentage of investigations classified as insufficient information has remained steady for the last four years.

In the following example, the case was coded insufficient information because the person's medical records did not support exposure to the product.

*A woman hit the barn wall as she was backing her car out and broke 2 brown unlabeled bottles of strong smelling liquid. She got the liquid on her hands and sought medical care at an emergency room for neurological, dermal and respiratory symptoms. The case was classified as insufficient information as it was not verified that the contents of the bottles were pesticides.*

## Severity of Medical Outcome

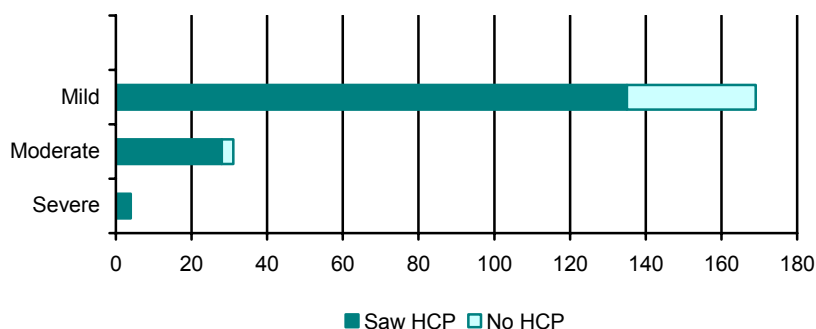
DOH uses the NIOSH Severity matrix for classifying signs and symptoms associated with pesticide cases (Appendix B). The low/mild category includes transient and spontaneously resolving symptoms such as nausea, vomiting, shortness of breath, headache, dizziness, and skin or eye irritation.

Even relatively pronounced symptoms such as profuse sweating, ataxia, peripheral neuropathy, eye pain, and difficulty breathing are classified as low/mild if a health care provider did not directly observe the symptoms. The moderate

category includes signs and symptoms which are pronounced and/or prolonged and in most cases must be observed by a health care provider. These include second and third degree skin burns, ocular burns, systemic symptoms such as altered heart rate and slurred speech, and respiratory depression.

In 2004, 173 (85%) of the 204 definite, probable, or possible DOH cases were classified as mild. Twenty-nine (14%) cases were classified as moderate and 2 (1%) cases were classified as severe (Figure 8). Of the 204 DPP cases in 2004, 170 (83%) sought medical care for their symptoms.

**Figure 8. Severity of Medical Outcome, DPP Cases, 2004**



The following two examples describe cases that DOH classified as moderate and severe.

*Moderate case: A woman activated a flea fogger in the back of her two-door car and was unable to exit the car quickly when the seat stuck. She inhaled the product and developed acute respiratory symptoms. She was transported to the emergency room by ambulance. Medical examination documented vomiting, cough, wheezing and shortness of breath.*

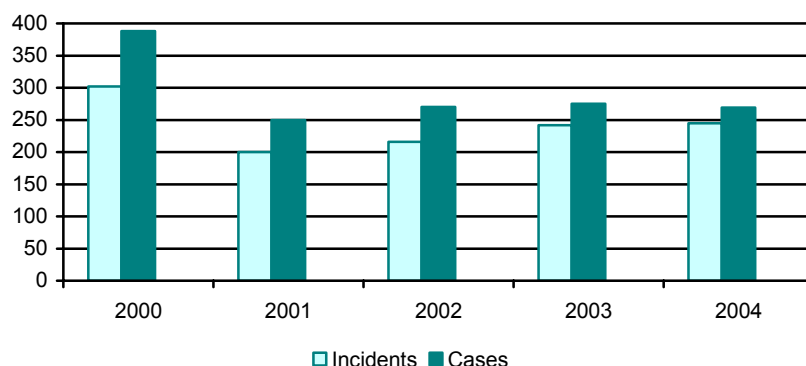
*Severe case: A crop truck driver was near an application (to wheat) containing chlorpyrifos methyl. He went home and later that evening his wife drove him to the emergency room where he was treated for neurological, gastrointestinal and cardiovascular symptoms. He was given atropine, stabilized and admitted to the hospital for two days. The attending physician also reported that he could smell pesticide on the patient.*

## Number and Location of Investigated Cases

### Number of Incidents

During 2004, the Pesticide Program investigated 245 reports of incidents involving 269 cases of pesticide illness (Figure 9).

**Figure 9. DOH Reported Incidents and Cases, 2000 - 2004**



### Seasonality of Incidents

The majority of investigated pesticide incidents occurred in the six months between April and September. This included 79% of agriculture-related cases, and 67% of non-agriculture cases. This is consistent with previous years.

### Number of Persons Involved

In 2004, there were 186 incidents involving 204 definite, probable, or possible cases. Of the 186 incidents, 173 (93%) involved 1 individual. Eleven incidents involved 2 persons. One incident involved 7 persons and one incident involved 4 persons. The incident involving 7 persons is described below.

*An unlicensed school employee applied an herbicide using a tractor mounted boom sprayer to a school parking lot and sidewalk at 6:30 a.m. on a school day. Signs were not posted and there was no notification of the application. Seven students and faculty members became ill after smelling the vapors from the application. DOH determined that 5 of the illnesses were definitely, probably or possibly related to the exposure. Two students reported only one symptom and were classified as insufficient information. Students and employees were evacuated from the school. WSDA investigated the incident and found several violations including failure to post and notify and applying a pesticide with powered equipment without a pesticide applicator license.*

## Location

In 2004, 29 of the 39 counties in Washington had cases definitely, probably, or possibly related to pesticide exposure. Table 25 lists the 11 counties with the most reported cases. Of the 205 DPP cases, 159 (78%) came from these counties while 67% of the state population resides in these 11 counties.

**Table 25. Counties with the Most Reported Cases\*, 2004**

County	Cases	Incidents
King	32	28
Yakima	23	21
Grant	19	17
Benton	16	11
Pierce	16	16
Snohomish	15	12
Thurston	9	8
Skagit	9	9
Chelan	8	7
Franklin	6	6
Clallam	6	6

\* Limited to cases with illness classified by DOH as definitely, probably or possibly due to pesticide exposure.

About half of the 204 DPP cases occurred in western Washington (109) and half in eastern Washington (95). This is consistent with past years and reflects population density and location of labor-intensive crops.

Figure 10 shows the location of combined definite, probable, or possible cases for 2004.

**Figure 10. Distribution of Cases by County, 2004**

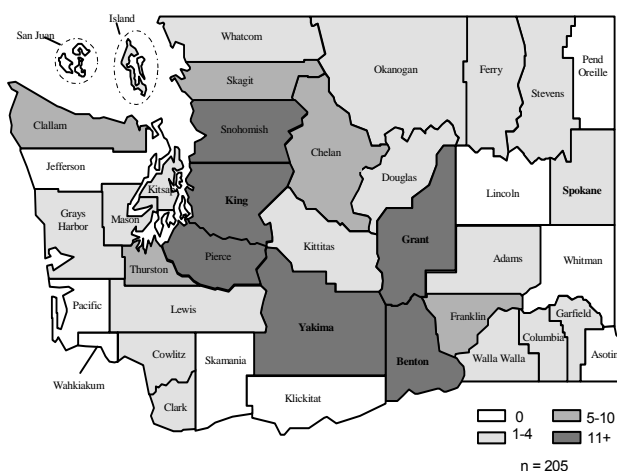


Table 26 displays the distribution of cases defined as definite, probable, or possible by agricultural and non-agricultural setting from 2000 through 2004.

**Table 26. Annual Agricultural and Non-Agricultural Cases\*, 2000 - 2004**

Year	Agricultural	Non-Agricultural	Total Cases
2000	113	90	203
2001	58	62	120
2002	75	99	174
2003	73	111	184
2004	64	140	204

\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

The decrease in agricultural cases since 2000 is primarily due to fewer reports of drift of agricultural pesticides to nearby homes. The number of occupational agricultural cases has not declined during this period. For non-agricultural cases, the increase since 2000 is due to increased reports of direct exposures to pesticides by the applicator, usually at their home. Typical exposures are spills and splashes while opening and pouring containers (contact) or wind blowing spray back onto the applicator (spray). Two types of exposures seem particularly problematic around the home: 1) eye exposures while spraying moss-out products overhead onto roofs and 2) skin and inhalation exposures to bee and wasp spray while spraying bee nests. Additional prevention education is needed to encourage carefulness and protective clothing for these applications.

### **Age and Gender**

In 2004, males (73) reported more occupational exposures than females (17). Females (60) reported somewhat more non-occupation exposures than males (54) (Table 27).

There were 22 cases involving children 18 years of age or younger that were determined to be definitely, probably, or possibly related to pesticide exposure. Sixteen of the 22 children were at home at the time of their exposures. One 3-year-old child was in a church yard during an herbicide application. Three teenagers got mosquito repellent their eyes. One student felt ill after an herbicide application to the school parking lot. Three teenagers who were employed at the time of their exposures were working at a golf course, home supply store, and horse stable.



**Table 27. Occupational and Non-Occupational Cases\* by Age and Gender, 2004**

Age	Occupational		Non-Occupational		Total
	Female	Male	Female	Male	
0-5			2	9	11
6-11			4	1	5
12-18		3	2	1	6
19-29	7	25	5	3	40
30-49	7	31	28	14	81
50+	3	14	19	26	62
<b>Total</b>	<b>17</b>	<b>73</b>	<b>60</b>	<b>54</b>	<b>204</b>

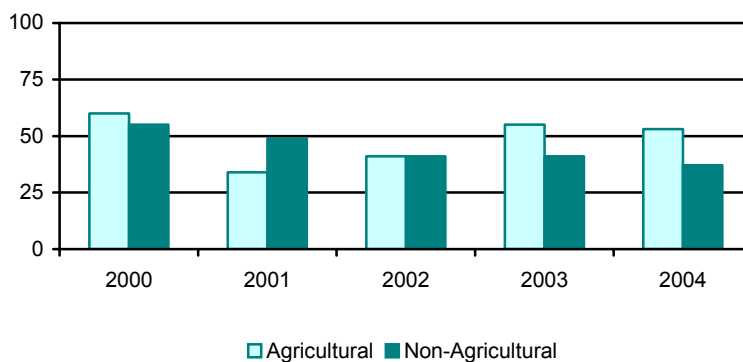
\* Limited to cases with illness classified by DOH as definitely, probably or possibly due to pesticide exposure.

## Occupational Cases of Pesticide-Related Illness

In 2004, 129 (48%) of all reported cases investigated by DOH involved a pesticide exposure on the job. Of these, 90 (70%) were classified as definite, probable, or possible cases. Fifty-three of the 90 DPP cases were agricultural workers and 37 were from other occupations.

Figure 11 shows DOH agricultural and non-agricultural occupational cases for the years, 2000 through 2004.

**Figure 11. Agricultural and Non-Agricultural Occupational Cases, 2000 - 2004**



## Agricultural Pesticide Incidents

In 2004, DOH investigated 97 reports of suspected pesticide-related illness involving agricultural operations. These exposures occurred when the pesticide application was intended for agricultural commodities such as fruit and field crops, nursery, livestock, and forest operations. Of the 97 cases, DOH classified 64 as definite (15), probable (21), and possible (28). In 2004, the types of exposure were somewhat evenly distributed between drift, direct spray, contact from a spill or leaking equipment, and surface residues (Table 28). All of the agricultural, non-occupational exposures were to drifts.

**Table 28. Agricultural Occupational and Non-Occupational Cases by Source, 2004\***

Year	Occupational	Non-Occupational	Total
Drift	5	11	16
Spray	15	0	15
Contact	12	0	12
Surface residue	11	0	11
Indoor air	1	0	1
Unknown	6	0	6
Other	3	0	3
<b>Total Cases</b>	<b>54</b>	<b>11</b>	<b>64</b>

\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

Pesticide drift was highlighted in the 2004 PIRT report as a continuing problem. Reported cases involving agricultural drift declined in 2004 (Table 29). It is too early to tell whether this trend is permanent. The annual number of drift cases tends to be variable since a single incident can sicken multiple people. Drift to workers generally involves farmworkers. Drift to non-workers generally involves people in their homes, driving on roads, in parks, etc.

**Table 29. Agricultural Drift to Workers and Others, 2000 - 2004\***

Year	Occupational	Non-Occupational	Total
2000	34	25	59
2001	14	13	27
2002	16	30	46
2003	12	12	24
2004	5	11	16
<b>Total Cases</b>	<b>81</b>	<b>91</b>	<b>172</b>

\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

### **Pesticide Involved in DPP Agricultural Workers**

In 2004, there were 53 workers with illness/injury classified as definitely, probably, or possibly related to pesticide exposure during agricultural activities. Thirty-six of the 53 agricultural workers were applying or mixing/loading, maintaining pesticide equipment, or transporting pesticides at the time of their exposure. Seventeen workers were exposed to pesticide drift or residues on leaves while thinning, pruning, handling nursery plants, or doing other agricultural work. One third of the 53 cases involved exposure to cholinesterase-inhibiting insecticides although in almost half of these cases another pesticide was also in the tank mix. Azinphos-methyl was involved in 6 cases. Chlorpyrifos was involved in 5 cases. Sulfur and calcium polysulfide (lime sulfur) were involved in 9 cases, again, often in tank mixes. Although use of pyrethroid insecticides is increasing in agriculture, only one occupational exposure to cypermethrin was detected in 2004. Table 30 shows the pesticide active ingredients for DPP cases involving agricultural workers.

**Table 30. Pesticide Involved in DPP Cases Involving Agricultural Workers by Ingredient, 2004**

Pesticide	Handlers	Other Workers
<b>Cholinesterase Inhibitors</b>		
Azinphos-methyl	2	1
Chlorpyrifos	2	1
Dimethoate	1	
Disulfoton	1	
Malathion		1
Combinations of pesticides with cholinesterase inhibitors	5	2
<b>Other insecticides</b>		
Acetamiprid	1	
Aluminum Phosphide	1	
Cypermethrin		1
Methyl Bromide/Chloropicrin		1
Moxidectin		1
Combinations of insecticides without cholinesterase inhibitors	4	
<b>Herbicides</b>		
2, 4-D	1	
Glyphosate (mostly as Roundup)	6	
Paraquat dichloride	3	
Quizalofop-ethyl		1
Herbicide combinations	2	
<b>Fungicides</b>		
Calcium polysulfide	1	2
Captan	1	
Chlorine	1	
Pentachloronitrobenzene (PCNB)		2
Sulfur	3	
Combinations of fungicides and growth regulators		3
<b>Other</b>		
Prohexadione calcium	1	
Kaolin		1
<b>Totals</b>	<b>36</b>	<b>17</b>

**\*\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.**

### **Cholinesterase-Inhibiting Insecticides**

With the statewide implementation of cholinesterase monitoring by WISHA in January of 2004, there is continued interest in data specific to cholinesterase-inhibiting insecticides. Figure 12 presents pesticide illness/injury data among pesticide handlers for ten years (1995 through 2004) for these insecticides. Acute and dermal symptoms continue to be reported by handlers of cholinesterase-inhibiting insecticides. In 2004, there were 11 DPP cases; an increase over the previous two years. The numbers, however, are too small and variable to detect a reliable trend.

All but 1 of the 11 DPP cases sought health care in a hospital emergency room or clinic. This person received health care from his regular occupational health physician. Eight of the 11 cases occurred in tree fruit operations, mostly apples. The other 3 occurred at an onion farm, an unspecified farm, and an ornamental nursery. No cases involved aerial application. Most cases involved using (5) or cleaning/fixing (2) orchard ground sprayers.

### **Description of Cholinesterase Cases**

There were 4 cases of applicators driving orchard airblast sprayers who stated that they wore the proper personal protective equipment, wore fit-tested respirators and who still had symptoms and/or significant cholinesterase inhibition. These workers told DOH in interviews that they sometimes still smell the chemicals through the cartridges and feel mist on their face when they turn the corner at the end of a row. One of these workers had 80% depression on his plasma cholinesterase activity. A fifth orchard airblast sprayer lost his positive pressure helmet when it caught on wires in the orchard and flipped off his head.

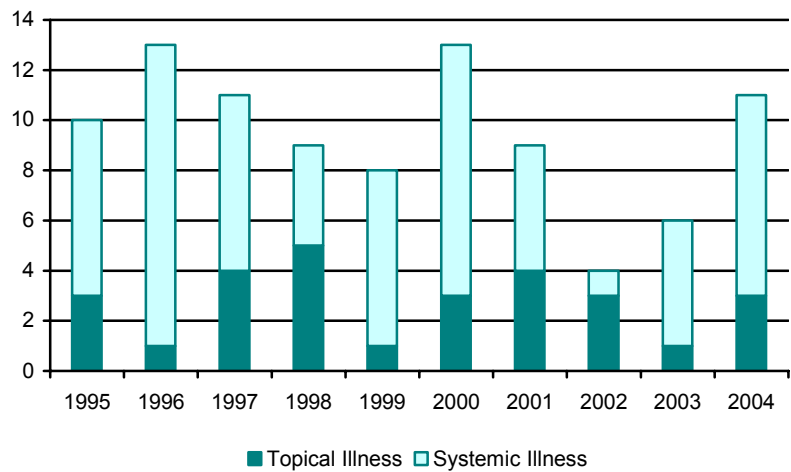
Two men were exposed while cleaning sprayer nozzles or fixing a sprayer. Cleaning and repairing contaminated equipment is considered "handling" and full pesticide handler's personal protective equipment is required. In both cases the mechanic only wore rubber gloves. One of these mechanics experienced systemic symptoms and at least a 23% depression in plasma cholinesterase. The other developed respiratory symptoms and contact dermatitis where pesticides from the sprayer hit his forearms.

There were 2 handlers who had exposures while transporting pesticide to the loading site or putting away a cleaned sprayer. Both were in the handling area but did not have on personal protective equipment because they had not yet started or had just finished their direct handling duties. Both were exposed to spray from other handlers in the area. Personal protective equipment should be worn at mixing and load sites and in areas where sprayers are being washed.

Six of the 11 handlers were enrolled in the cholinesterase monitoring program. Two had significant depressions detected (80% and 57%). Two had only baseline tests and were not tested again after their exposure. Two had no depression in tests done 10 days post-incident relative to their baselines although one had only dermal symptoms. Of the 5 handlers who were not

enrolled, 2 worked at nurseries, one in an apple orchard, one at an onion farm, and one at an unspecified farm. We do not know whether they had more than 30 hours of relevant handling in a 30-day period. Only one had cholinesterase testing following their exposure. In this case a depression was indicated: testing done one week after exposure was 23% lower in plasma cholinesterase activity than a test taken four weeks post-exposure.

**Figure 12. Cases by Type of Illness and Injury\* for Pesticide Handlers\*\*, 1995 - 2004**



\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

\*\* Agricultural workers who handle cholinesterase inhibitors via mixing, loading, applying, or repairing equipment.

Table 31 shows the number of agricultural workers with reports of illness associated with specific cholinesterase-inhibiting insecticides singularly or in tank mixed combinations with other pesticide products for 2000 through 2004.

**Table 31. Illness Type\* for Pesticide Handlers\*\* by Cholinesterase Inhibiting Pesticides, 2000 - 2004**

Pesticide	2000		2001		2002		2003		2004		Totals	
	S	T	S	T	S	T	S	T	S	T	S	T
Azinphos methyl	1	1					1		2		4	1
Chlorpyrifos	2								2		4	
Dimethoate			1							1	1	1
Disulfoton									1		1	
Ethoprop							1				1	
Combinations of cholinesterase inhibitors with other products	7	2	4	4	1	3	3	1	3	2	18	12
<b>Totals</b>	<b>10</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>29</b>	<b>14</b>

\* Type of illness/injury: S = Systemic: Any health effects not limited to the skin and/or eye.  
T = Topical: Health effects involving only the eyes and/or skin.

\*\* Agricultural workers who handle cholinesterase inhibitors via mixing, loading, applying, or repairing equipment.

### Agricultural Crops Involved

Table 32 shows the crop associated with the 64 DPP cases resulting from agricultural pesticide use in 2004. The crops involved were fruit (41) and field or vegetable (11). Seven exposures occurred at nurseries, 3 at livestock or dairies operations, and 2 involved forest lands or pasture. Four exposures were the result of malfunctioning equipment.

In 2004, as in past years, the leading crops associated with reported cases are tree fruit, one of the primary agricultural sectors of the state economy. These are labor intensive crops requiring workers to be thinning, pruning, or harvesting during the same times of year that pesticides are applied. Dense planting of trees impedes the applicator's line of sight and requires excellent communication with farm foreman and with neighboring farms to keep all workers clear of pesticide applications. The airblast sprayer commonly has no enclosed cab, as this does not fit well between the rows of trees. This leaves drivers of airblast sprayers relatively exposed to the high pressure spray and reliant on personal protective equipment to protect them from contact with spray. The high pressure spray is also prone to drift. Thirty-three (80%) of the 41 cases in fruit production were agricultural workers. Twenty-four of these 33 workers were applying, mixing, or loading pesticides or were repairing pesticide equipment. Nine workers were pruning trees or thinning/picking fruit at the time of their exposure. Eleven cases were not working; they were exposed to pesticide drift in their homes.

### Cases Resulting from Applications to Field Crops

In 2004, there were 10 incidents with 11 cases involving pesticide applications to field crops (Table 32). The field crops included hops, peas, potatoes, onions and

wheat. Eight of the 11 cases were agricultural workers and 6 of the 8 workers were handling pesticides at the time of exposure. The 3 non-occupational cases were exposed drift of pesticides applied to potatoes. The 3 were at home when exposed.

**Table 32. Agricultural Cases\* by Target and Activity, 2004**

	Applying	Mix/load/ Repair	Routine Work	Outdoor Living	Indoor Living	Total
<b>Fruit</b>						
Apples	11	5	7	2		25
Cherries			1	3		4
Grapes	2	1				3
Nectarines			1			1
Peaches		1				1
Pears	1			1	2	4
Raspberries	1	1				2
Unknown fruit	1					1
<b>Field and Vegetable Crops</b>						
Hops	1	1				2
Peas			1			1
Potatoes	1			1	2	4
Onions		1	1			2
Wheat	2					2
<b>Other Agricultural</b>						
Dairies	1		1			2
Forest lands	1					1
Livestock			1			1
Nurseries	2	1	4			7
Pasture	1					1
<b>Totals</b>	<b>25</b>	<b>11</b>	<b>17</b>	<b>7</b>	<b>4</b>	<b>64</b>

\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

## Non-Agricultural Pesticide Incidents

Of the 269 cases investigated in 2004, 172 were associated with non-agricultural pesticide use. DOH determined 140 (70%) of these to be definitely, probably, or possibly related to pesticide exposure (Table 33). Non-agricultural incidents include pesticide applications or spills that occur at homes, commercial buildings, industrial sites, or on roadways. Of the 140 DPP non-agricultural exposures, 97 (69%) occurred at residential sites. Thirty-seven (26%) of the individuals were working at the time of exposure and 103 (74%) were not at work.



**Table 33. Exposure Site for Non-Agricultural, Occupational and Non-Occupational Cases, 2004\***

Exposure Site	Occupational	Non-Occupational
Residential building or grounds (home, apt)	8	89
Other institution (school, church, prison)	6	3
Office, retail or service businesses	11	5
Park, lake, golf course, camp grounds	2	2
Roads or vehicles	3	3
Industry, warehousing, other manufacturing	7	0
Area-wide mosquito application	0	1
<b>Total non-agricultural pesticide use</b>	<b>37</b>	<b>103</b>

\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

### Non-Agricultural Occupational

In 2004, 37 non-agricultural cases occurred on-the-job; 28 were males and 9 were females. Fourteen of the 37 cases were handling pesticides at the time of exposure. The following example is a non-agricultural, occupational incident from 2004:

*A lawn care technician pumped up a small hand-held spray applicator. The hose was not securely attached to the tank and popped off under pressure, spraying him in the face. He washed his eye and sought medical treatment.*

### Non-Agricultural Non-Occupational

In 2004, 103 exposures occurred where the person was not working and the release was not associated with agriculture. Nineteen were children and 84 were adults over the age of 18. Of the 84 adults, more were women (46) than men (38). Eighty-nine of the 103 non-occupational cases occurred in homes (Table 33).

The following is an example of a non-agricultural, non-occupational case classified as definitely related to the exposure:

*A 72 year old male homeowner used his bare hands to apply a pesticide powder/paste to holes where bees were entering his log home. He mixed 5 pounds of 10% dust in water to form the paste. He also sprayed two cans of wasp spray on the holes. He wore no personal protective equipment in violation of the pesticide label. He sought medical care for moderate gastrointestinal and neurological symptoms.*

### Non-Agricultural Non-Occupational Exposures to Applications by Non-Professional and Professional Applicators

In 2004, 93 (90%) of the 103 non-agricultural, non-occupational DPP cases involved exposures to pesticide applications by non-professional applicators (unpaid individuals, co-workers, home-owners) (Table 34). Ten cases were exposed to applications by professional (paid) applicators.

The 93 non-professional applications involved pesticide treatments of:

- ornamental weeds, insects or snails (27)
- insects in the home (21)
- treatments to people or pets for fleas, lice, or biting insects (18)
- herbicides treatments moss or weeds (10) or
- accidental ingestion or release of pesticide products (17)

Of the 10 cases in which individuals were exposed to applications made by paid, professional applicators, 9 involved herbicide applications to moss or weeds and one involved an area-wide mosquito application (Table 34).

**Table 34. Target Pest for Non-Agricultural, Non-Occupational Cases Exposed to Pesticide Applications by Professional\* and Non-Professional Applicators, 2004\*\***

	Professional Applications	Non-Professional Applications
<b>Landscape/Garden Use</b>		
Weeds and moss	4	18
Insects	0	8
Snails	0	1
<b>Use In/Around Structures</b>		
Insects (fleas, wasps, spiders, ants)	5	21
Moss/weeds	0	10
<b>Applications to People/Pets</b>		
Lice	0	6
Insect repellents	0	6
Applications to pets for fleas	0	6
Accidental release or ingestion	0	17
<b>Area-wide</b>		
Mosquitoes	1	0
<b>Total</b>	<b>10</b>	<b>93</b>

\* Professional is defined as persons paid (licensed or unlicensed) to apply the pesticide.

\*\* Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.

## Grandview Pesticide Fire

In 2005, DOH conducted a community-wide investigation following a pesticide warehouse fire in Grandview. Data from follow-up on cases during the investigation will not be entered in the DOH data system of pesticide-related events because environmental monitoring and biomonitoring were largely negative for pesticides. As there is much to learn from the incident, the DOH investigation is described below.

On Wednesday January 26, 2005, a warehouse at the Wilbur Ellis Facility in Grandview Washington caught fire. Over 200 pesticides, fertilizers and other agricultural products burned. People within one-half mile of the burning warehouse were evacuated from their homes. An estimated 300-400 residents and business owners were evacuated. A 13-mile section of State Highway 82 between Prosser and Sunnyside was closed by state patrol for more than 12 hours. Grandview's high school, middle school, and McClure Elementary School, all located approximately one mile south of the fire, turned off their ventilation systems and kept children inside. Shelters were set up by the American Red Cross for evacuated residents. The newspaper reported that 175 evacuated residents registered for shelter.

The response involved many parties including the: Grandview Police Department, 11 local fire departments, Washington State Patrol, Ecology, EPA, private contractors for Wilbur-Ellis, and local and state departments of health. The fire burned for two and a half days. People were allowed to return to their homes Friday evening after air sampling and swab sampling indicated the inhalation hazard had passed.

DOH played a supporting role by providing technical assistance to local health authorities and other state and local agencies. DOH also conducted pesticide-illness monitoring according to state law. During follow-up on possible pesticide-related illnesses, DOH identified multiple persons who sought health care for symptoms from inhaling smoke. DOH also tracked the results of medical monitoring of emergency responders.

### Smoke-related Illnesses in the Surrounding Community

DOH identified 48 people who sought health care for symptoms associated with breathing smoke from the fire (Figure 13). There were an additional 5 people with complicated medical histories who were admitted to Prosser Hospital as a precaution and for nursing support until they could return to their normal residences. Four of these individuals were from a nursing care facility outside the half mile evacuation zone and one person was from an evacuated house.

DOH identified an additional 8 persons who reported symptoms but were not seen by health care providers (Figure 13). However, DOH cannot estimate the number of ill persons who did not seek health care in the local area. Smoke from burning buildings is known to cause eye and respiratory irritation and can

exacerbate asthma and other respiratory conditions. There were likely numerous people who experienced mild symptoms but did not seek health care.

**Figure 13. People Reporting Symptoms and/or Receiving Medical Care**

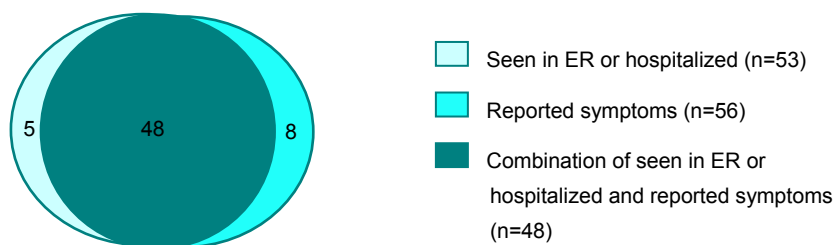


Table 35 shows the number of people reporting symptoms; 75% of the identified community members with symptoms reported respiratory symptoms. Most of the symptoms were mild to moderate and included coughing, burning in nose or throat. A subset also described some type of labored breathing. Many of these people had a history of asthma or other respiratory conditions.

**Table 35. People Reporting Symptoms from the Grandview Fire**

Symptom Type and Description	Reporting Symptom	Total Percentage
Respiratory irritation (cough, burning in nose/throat, sore throat)	40	71%
Labored breathing (wheezing, shortness of breath, chest tightness). All but 2 also reported respiratory irritation.	15	27%
Headache. Some headaches persisted for several days	35	63%
Nausea, vomiting or abdominal pain	32	57%
Dizziness, weakness or other systemic symptoms	19	34%
Eye irritation (watering or burning in eyes)	18	32%
Numbness or tingling in tongue or face	6	
Burning rash or urticaria on face or neck	5	

### Follow-up of Emergency Responders

DOH efforts identified 67 emergency responders that either reported symptoms or received some type of occupational health monitoring. Several firefighters, state patrolmen, and spill response experts sought medical care for symptoms but most emergency responders reported no symptoms. All firefighters and many of the Grandview city employees involved in the response had basic blood tests plus a test for cholinesterase inhibition. The cholinesterase test was done to

detect over-exposure to the most acutely toxic pesticides that burned in the warehouse. All cholinesterase results were within normal limits.

### **Sampling for Pesticides in Air**

Air samples for pesticide active ingredients conducted by the EPA and Washington State University were negative or detected pesticides only at concentrations well below the EPA levels of concern. However, pesticide sampling was initiated on the second day of the fire and may have missed pesticides present in the initial smoke. Swab samples for pesticide residues were also negative. This suggests that the fire did not result in widespread deposition of pesticide residues in the community.

Of course, smoke from burning buildings is irritating and toxic and may contain hazardous concentrations of carbon monoxide, hydrogen sulfide, hydrogen cyanide, nitrogen and sulfur oxides. Burning pesticides and fertilizers would contribute combustion byproducts to the smoke and result in higher levels of sulfur oxides, hydrogen sulfide, hydrogen chloride, and ammonia. Early reports of a strong sulfur-like smell in the smoke suggest that this was the case.

## **Highlights of DOH Prevention Activities 2005**

### **Local, State and Federal Government**

The DOH Pesticide Program provides technical assistance to state and local agencies on pesticide toxicology and human health. In 2005, assistance was provided to Department of Transportation (herbicide risk assessment review), Ecology (aquatic herbicide permits), WSDA (gypsy moth eradication projects in Silverdale and Seattle), and L&I (cholinesterase monitoring for farm workers). DOH also provided assistance to county health departments, including Yakima County (health advice for people living near a pesticide warehouse fire), King County (review of pesticide hazards at daycares), and Thurston County (toxicology support for pesticide reviews required by County policy).

DOH, with assistance from WSDA, conducted a presentation about the PIRT Panel and current pesticide issues to the State Senate Agricultural Committee. DOH prepared a briefing sheet for the State House Commerce and Labor Committee's agricultural safety and health tour in Yakima.

DOH forwarded pesticide illness monitoring data to NIOSH for compilation of national pesticide illness statistics, <http://www.cdc.gov/niosh/topics/pesticides/>.

In 2005, DOH sent the following product issues to EPA:

DOH Case 040222: An 18 year old worker experienced severe eye reaction after accidental splash of *Deep Woods Off for Sportsmen Insect Repellent IV* (EPA registration no. 4822-397). He rinsed his eye within five minutes and received medical attention within 20 minutes of exposure. He still sustained a corneal burn with almost total loss of corneal epithelium. His burn healed slowly over 14 days. There are many cases of eye exposure to other repellent formulations reported to DOH during mosquito

season. Most are managed at home and symptoms resolve quickly. DOH alerted EPA that this formula appears to be particularly harmful to eyes. DOH questioned whether this is a reasonably safe formulation for consumer use, especially given that many effective repellents in safer formulations are available.

DOH case 050182: A 56 year old female placed a new flea collar on her elderly cat before going to work. The flea collar was *Hartz Advanced Care 3 in 1 Control collar for Cat* (EPA Registration no. 2596-139). The product contains methoprene (1.02%), tetrachlorvinphos (14.55%), and undisclosed other ingredients (84.43%). The woman noted a strong odor in the house upon her return that evening. Both she and the cat had systemic symptoms consistent with organophosphate insecticide exposure. She removed the collar, opened windows and turned on fans. Symptoms resolved in two days. This case was unusual in that it is not normal to smell a strong odor with flea collars, or to experience symptoms after this type of use. DOH alerted EPA that this was a possible product defect and to look for similar cases involving this product.

DOH met with federal officials at EPA and Centers for Disease Control to present data and share health concerns about fumigant pesticides. DOH submitted written comments and state data to EPA during the public comment period for metam-sodium re-registration. Concerns raised by DOH, based on case investigation data, included 1) the glove recommendation on the metam-sodium label may need to be more specific, 2) the importance of considering the main breakdown product, methyl isothiocyanate (MITC), in the re-registration process, 3) regulation of metam sodium drift, 4) the importance of measuring MITC in air during enforcement investigations, and 5) the importance of modeling Washington's chemigation applications of metam-sodium in EPA's risk assessment of bystander exposures. DOH comments are included in Appendix G.

### **Licensed Pesticide Applicators**

Staff conducted multiple presentations to educate licensed pesticide applicators on the prevention of pesticide-related illness. Presentations were conducted at professional meetings and at Washington State University and WSDA continuing education courses. Presentations were in English or Spanish and covered acute and chronic effects of pesticides, safety, and cholinesterase monitoring. DOH published an article on proper use of personal protective equipment in the WSDA newsletter which reaches 28,000 licensed pesticide applicators in the state, <http://agr.wa.gov/PestFert/Publications/docs/2005PesticideNotes.pdf>. DOH collaborated with partners to develop an educational video on proper decontamination for pesticide handlers. The video will be completed in 2006 and will be available in Spanish and English.

### **Farm Workers and General Agricultural Community**

Staff members regularly attend and occasionally present at meetings of the Commission on Hispanic affairs. Our bilingual staff were guests of Spanish radio station KDNA in Yakima on three occasions. During the shows they spoke about pesticides and health issues and answered caller's questions. Staff conducted a presentation at the Migrant Stream Forum in San Diego and staffed a booth at the Latina Health Fair in Seattle. Staff participated in worker protection training conducted by WSDA and L&I, and met with farm worker advocates at the Northwest Justice Project and Columbia Legal Services. DOH Pesticide Program bilingual staff assisted other DOH programs in translating health educational recordings and materials into Spanish.

### **Outreach to Agricultural Growers Groups**

DOH staff members maintain contact with agricultural grower groups at regular board meetings of the Pesticide Advisory Board, the Washington State Commission on Pesticide Registration and the Washington Friends of Farms and Forests. Staff presented information about emerging scientific evidence on long-term health effects of pesticide exposure to the Washington Friends of Farms and Forests annual legislative meeting.

### **Urban Consumer Education**

DOH revised and expanded the Pesticide Program website with online resources for consumers, <http://www.doh.wa.gov/ehp/ts/pest/default.htm>, participates in the continuing development of the interagency website UPEST, <http://www.ecy.wa.gov/programs/swfa/upest/>. A new module that will help consumers control indoor home pests using Integrated Pest Management is under development for the UPEST website.

This year DOH focused on promoting Integrated Pest Management approaches to pest management in schools. Staff co-authored a report in the Journal of the American Medical Association on pesticide illness data in schools, <http://jama.ama-assn.org/cgi/content/short/294/4/455>, prepared state web pages on pesticide incidents in Washington schools, <http://devwww.ehp/ts/Pest/pest-school-wadata.htm>, organized presentations on Integrated Pest Management for schools, and revised the UPEST website that aids Washington schools in adopting Integrated Pest Management.

### **Health Care Providers**

DOH launched a new web resource for health care providers on the revised and expanded Pesticide Program Web site. The new pages have details about how and why to report pesticide-related illnesses, what happens when a case is reported, how to identify the pesticide involved, taking an exposure history, resources for clinical management of pesticide-related illnesses, how to refer possible violations to state enforcement agencies, and downloadable fact sheets for patients on a number of safety topics.

Another main effort this year has been to organize and send case investigation findings to the treating health care provider and to send annual investigation summaries to local health officers. This is described in greater detail in the PIRT Panel Activities section on page 13.

DOH published a paper with the Federal Drug Administration, the Centers for Disease Control, and other states alerting health care providers and other public health officials about the acute hazards of lindane prescriptions for lice and scabies control, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5421a2.htm>.

### **Partnerships**

Staff from the Pesticide Program participate on various Advisory Boards, Stakeholder Committees, and other organizations around the state:

- Catholic Rural Life "Protecting Our Future": a Pesticide Education Project
- Cholinesterase Monitoring Stakeholder Committee for L&I
- Food and Environmental Quality Laboratory, Washington State University
- Fred Hutchinson Cancer Research Center "For Healthy Kids", Governor's Pesticide Advisory Board
- Pacific Northwest Agricultural Safety and Health "Projecto Bienestar"
- Pesticide Incident Review and Tracking Panel (Chair)
- Spanish Public Radio KDNA (President, Community Advisory Board)
- Thurston County Vegetation Management Board
- Washington Friends of Farm and Forests (non-voting, advisory member)
- Washington State Commission on Pesticide Registration (non-voting member)